

WHAT IS CLAIMED IS:

1. A photodiode comprising:
a first region of semiconductor material having a first conductivity
5 type and a first dopant concentration;
a second region having a second conductivity type and a second
dopant concentration, the second region lying over and contacting the
first region of semiconductor material at a first junction, the first
junction forming a first depletion region; and
10 a third region having the first conductivity type, the third region
lying over and contacting the second region at a second junction, the
second junction forming a second depletion region.
2. The photodiode of claim 1 wherein the first depletion
15 region absorbs electromagnetic radiation that represents blue light, and
generates blue electron-hole pairs in response to absorbing the
electromagnetic radiation that represents blue light.
3. The photodiode of claim 2 wherein the second depletion
20 region absorbs no electromagnetic radiation that represents blue light.
4. The photodiode of claim 3 wherein the third region has a
first portion that has a first dopant concentration, and a second portion
that has a second dopant concentration that is substantially greater than
25 the first dopant concentration.
5. The photodiode of claim 4 wherein the first portion
includes boron, and the second portion includes indium.

6. The photodiode of claim 4 wherein the second portion has a rate of change of dopant concentration to depth that is substantially greater than a rate of change of dopant concentration to depth of the first portion.

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7. The photodiode of claim 2 wherein the third region includes indium.

8. The photodiode of claim 1 wherein the second depletion region absorbs electromagnetic radiation that represents blue light, and generates blue electron-hole pairs in response to absorbing the electromagnetic radiation that represents blue light.

9. The photodiode of claim 8 wherein the first depletion region absorbs electromagnetic radiation that represents green light.

10. The photodiode of claim 3 wherein the third region has a first portion that has a first dopant concentration, and a second portion that has a second dopant concentration that is substantially greater than the first dopant concentration.

11. The photodiode of claim 10 wherein the first portion includes boron, and the second portion includes indium.

12. The photodiode of claim 10 wherein the second portion has a rate of change of dopant concentration to depth that is substantially greater than a rate of change of dopant concentration to depth of the first portion.

13. The photodiode of claim 10 wherein the third region includes indium.

5 14. A method of forming a photodiode from a first region of semiconductor material having a first conductivity type and a first dopant concentration, the method comprising the steps of:

forming a second region having a second conductivity type and a second dopant concentration, the second region contacting the first region of semiconductor material at a first junction, the first junction
10 forming a first depletion region; and

implanting a first dopant having the first conductivity type into the second region to form a third region that contacts the second region at a second junction, the second junction forming a second depletion region.
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15. The method of claim 14 wherein the first depletion region absorbs electromagnetic radiation that represents blue light, and generates blue electron-hole pairs in response to absorbing the electromagnetic radiation that represents blue light.
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16. The method of claim 15 wherein the second depletion region absorbs no electromagnetic radiation that represents blue light.

25 17. The method of claim 16 and further comprising the step of implanting a second dopant having the first conductivity type to form a fourth region that contacts the third region, the first and second dopants being different.

30 18. The method of claim 17 wherein the third region has a first dopant concentration, and the fourth region has a second dopant

concentration that is substantially greater than the first dopant concentration.

19. The method of claim 14 wherein:
- 5 the second depletion region absorbs electromagnetic radiation that represents blue light, and generates blue electron-hole pairs in response to absorbing the electromagnetic radiation that represents blue light, and
- 10 the first depletion region absorbs electromagnetic radiation that represents green light.

20. The method of claim 19 and further comprising the step of implanting a second dopant having the first conductivity type to form a fourth region that contacts the third region, the first and second dopants
- 15 being different.